
Stage Lighting Design

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PART 7 - Lighting Education

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7.01 - TRAINING AND EDUCATION

1.) LIGHTING DESIGN - TRAINING

"It is necessary to improve educational programs for lighting design. Design and energy consultants require special instruction with a broader foundation than present curricula provides. Lighting design education should cross departmental lines.

Lighting design encompasses esthetics, perception, illumination and specific technical expertise. These are used to reinforce project goals. Improvement in lighting design education must fulfill the needs of the designer and those served.

Design for the arts, architecture, industry and other applications requires a thorough understanding of the psychological, psycho-physical and physical aspects of lighting. The characteristics of human, photographic and photo-electric receptors must be addressed.

Properly trained people are readily employable but job entry requirements are significantly more stringent than in the past. Educators must respond.

Lighting design is the process of creativity using the qualities and functions of light to affect people, objects and space. The qualities of lighting are intensity, form, color and movement. The functions of lighting are visibility, mood (atmosphere), composition and motivation. Study should include at least a fundamental understanding of the following:"

A) Design Technique and Application

Color, light sources, photometrics, brightness relationships,
introduction to and evaluation of typical lighting applications.
Drafting and visualization.

B) Human Responses to Light

Sight, esthetics, behavior, photobiology

C) Electrical Control and Distribution

D) Optical Control and Distribution

E) Lighting Equipment Types and Application

F) Specialized Topics

Conservation of energy, materials, safety codes and regulations,
history, photographic and photoelectric reproduction
technology.

NOTE: This above statement was formulated by T.O.L.D. (Training of Lighting Designers) in 1981. It was supported by many professional lighting organizations. This statement still very much applies today and should be used as the basis of any complete educational program.

7.02 - HANDS ON EXPERIENCE

1.) LIGHTING DESIGN - EXPERIENCE

Any successful lighting design ultimately depends on the designer understanding his equipment, not just in theory but in practice. Experience is the key to any good design.

2.) A BEST EXERCISE

One of the best exercises for any potential lighting designer is to simply work in a small theatre with typical fixture types. The fixtures should be in typical positions, (front, back, side, down, etc.) at a usual distance (12-30'). Start with the four (4) basic fixture types.

- a.) 6" ellipsoidal reflector
- b.) 6" fresnel
- c.) 10" Par64MFL
- d.) 24" Flood

Each fixture should be used (one at a time) to light a small scene, against a black backdrop and floor and then against a white backdrop and floor. The designer will usually be quite surprised at how just changing the scenery from black to white (light to dark), can drastically 'change the lighting'. This provides a great lesson regarding reflection, absorption, intensity, color, moods, etc.

The designer will also note the different lighting qualities of each of the different fixture types. He must learn to visualize the beam of light as a three dimensional cone of light traveling through space and intersecting with the scenery (or actor). He must know how bright any fixture will be at any distance and what the beam size will be.

Next the designer should repeat the exercise with the same four basic fixtures, but this time at a nearer then farther distance. It will be noted how drastically both beam size and intensity change.

Now repeat the exercise combining 2 or more fixtures positioned as front, side, back or down lights. Next, repeat all of this with an actor. Got the idea?

Once the designer instinctively 'knows' exactly what his equipment is capable of, the job of design becomes the joy of design. Lighting design, regardless of style or method, simply consists of placing light accurately, where needed.

There are a number of stage lighting texts that try to photographically illustrate the basic lighting

fixture types in various positions, in relation to an actors. One of the best studies can be found in ' The Magic of Light' (Jean Rosenthal). This black and white study shows both single and multiple lamp arrangements, using both ellipsoidal reflector and fresnel fixtures.

7.03 - PROCEDURE VS RESULTS

1.) THE DILEMMA OF THE DESIGNER Much of what the stage lighting designer does, has to do with solving problems. It is usually important for the director and other designers to impose their visions, on the production. When they do however, they must have the necessary skills to know how to realize these visions.

When a director and designers, conceive a production, they must first define their fixed parameters, including; budgets, space limitations, number of cast members, time and labor available, etc. Next, they must conceive the production in a responsible way, so as to work within the given parameters. The key word here is ' responsible' .

Any design problems that the director and designers create, they must be able to solve. Not in theory, with unlimited budgets, space, crew and time, but ' now' and within the budget of their show and not some imaginary fantasy production. "If we only had more time",...usually means..."If only we had planned properly".

"Don' t worry we' ll fix it with light". Lighting designers have always been considered both magicians and miracle workers, or so it seems from the attitudes of others. Because we can' t see, touch, taste, hear or smell light, it often seems mysterious and difficult to understand.

Well yes, the lighting designer can ' fix' a number of problems, with light, but there are also limitations. It is important that the lighting designer understands these limitations and fully collaborates with the director and other designers during all stages of design, ... so that it isn' t necessary to "fix the production with light."

The lighting designer is not a god. He is however an important member of the design or production team. It is usually the PERFORMER that audiences pay money to see, not the lighting. In this respect the lighting designer may have to remind himself from time to time that he is of secondary importance only. Sometimes however the performer may indeed be secondary to the lighting, as in the case of some modern ' rock' shows or in the case of bad lighting design.

In an educational (or learning) situation it is usually PROCEDURE that is far more important than results. In a professional situation, it is RESULTS that are usually far more important than the procedure. The designer must work well with his electricians, and other members of the production team, to meet the expectations of the director and the needs of the production. If the lighting designer has been realistic about his design and resources, he usually has nothing to worry about.

It is often the designer that hasn' t done their homework, that starts to panic during the lighting setup. Tempers may flare and the crew may suddenly grow donkey ears and become incompetent. This usually scores no points with anyone. Remember, you are there to solve problems, not create them. Lighting design often has more to do with the psychology of working with people than it does with light and lighting, so PROCEDURE is also important. Lighting design is not a solitary process.

7.04 - EDUCATION - BEAM SPREAD CONCEPT

1.) INTRODUCTION

The lighting designer (and technician) must be able to rapidly determine the width of a beam, of a lighting fixture, at any distance. Usually the process requires the use of tables or multiplying factors, provided by the manufacturer. Throw away all your tables and never use them again. This method allows you to calculate the beam width of any fixture, at any distance, mentally!

2.) FIXTURE LIGHTING ANGLES

Stage, television, architectural and display spotlights all come with specific ' beam spreads' , usually referred to as the; beam, field & cutoff angles. Typically focal lengths range from 5 to 150 degrees.

When a manufacturer claims that a fixture is ' 20 degrees' , he usually means that the ' field' or ' cutoff angle, is 20 degrees. Lighting fixtures come in two basic types: fixed and adjustable focal lengths.

3.) THE METHOD

What is the beam width of a 55 deg. fixture at 55 ft.? ANS: 55 ft.

Yes that' s right a 55 degree angle produces a beam spread of 1:1. So at 10 feet, the fixture would produce a 10 foot wide beam.

Draw a 55 degree angle (to scale) and check this for yourself. Learn to visualize in your mind what a 55 deg. angle, looks like. Also learn to visualize it as a three dimensional cone of light. A ' wide' angle ellipsoidal fixture and an adjustable fresnel type fixture are both examples of fixtures able to produce this spread angle.

Now through simple interpolation if a fixture of 55 degrees provided a 55 foot wide beam, (at a given distance), what would a 25 degree fixture produce? That' s right, the beam would be just under 1/2, or about 25 ft. wide.

4.) EXAMPLE

What is the beam width of a 40 degree fixture (6x9) at 18 feet?

Well, you already know that if it was 55 degrees spread, then the beam width would be 18 feet. And, you also know that a 25 degree fixture would produce a beam width of about 8 feet. So, your 40 degree fixture is right in the middle of the range.

So if 55 degrees = 18 ft.beam width
 And 25 degrees = 8 ft.beam width
 Then 40 degrees = 13 ft.beam width (halfway between 8 & 18).

Once the designer has mastered the above technique, tables and formulae may be used for even faster calculations.

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